CLAIMS

1. A method of determining a camshaft position comprising:

determining a plurality of temperatures including a current temperature;

measuring a camshaft deviation at each of the temperatures;

determining a camshaft deviation gradient based on the temperatures; and

updating the camshaft position based on the camshaft position measured at the current temperature, at least one of the camshaft deviations, the camshaft deviation gradient, and the current temperature.

2. The method of claim 1, wherein the temperatures further comprise at least one of an oil temperature, a coolant temperature, and a water temperature.

3. The method of claim 1, wherein determining the camshaft deviation gradient further comprises:

determining a temperature difference between two temperatures;

determining two camshaft deviations at the two temperatures;

determining a camshaft difference between the two camshaft deviations; and

determining the camshaft difference by the temperature difference, thereby generating the camshaft deviation gradient.

4. The method of claim 3, wherein determining the two camshaft deviations comprises:

sensing a first camshaft position at the first temperature;

comparing the first camshaft position with a first referenced position, thereby generating the first camshaft deviation;

sensing a second camshaft position at the second temperature; and

comparing the second camshaft position with a second referenced position.

5. The method of claim 1, wherein updating the camshaft position further comprises:

determining a camshaft deviation intercept using the camshaft deviation, the temperature, and the camshaft deviation gradient;

determining a deviation product between the camshaft deviation gradient and the current temperature; and

summing the camshaft deviation and the deviation product.

6. The method of claim 1, wherein determining a camshaft deviation gradient further comprises approximating a deviation temperature curve using the temperatures and the camshaft deviations.

7. The method of claim 6, wherein the deviation temperature curve comprises a linear regressive curve.

8. The method of claim 1, wherein determining the temperatures comprises:

retrieving a maximum temperature and a minimum temperature;

assigning a new minimum temperature when the minimum temperature is greater than the current temperature; and

assigning a new maximum temperature when the maximum temperature is less than the current temperature.

9. A method of determining a camshaft position comprising:

retrieving camshaft position data from a memory;

determining a camshaft deviation temperature curve using the camshaft position data;

measuring a camshaft position at a current temperature;

approximating a camshaft deviation with the camshaft deviation temperature curve and the current temperature; and

updating the camshaft position based on the approximated camshaft deviation.

10. The method of claim 9, wherein the camshaft position data comprises a plurality of temperatures and a plurality of corresponding camshaft deviations.

11. The method of claim 10, further comprising:

measuring a camshaft position for each temperature; and

comparing the camshaft position with a referenced camshaft position to generate a camshaft deviation at each temperature.

12. The method of claim 9, further comprising determining a rate of change of camshaft position data.

13. The method of claim 12, further comprising:

determining a camshaft deviation intercept using the camshaft position data;

determining a deviation product between the rate of change of camshaft position data and the current temperature; and

summing the camshaft deviation intercept and the camshaft deviation intercept.

14. The method of claim 9, wherein the camshaft deviation temperature curve comprises a linear regression curve.

15. The method of claim 9, wherein determining the camshaft deviation temperature curve further comprises numerically approximating a curve through the camshaft position data.

16. The method of claim 9, wherein approximating a camshaft deviation comprises plugging the current temperature into the camshaft deviation temperature curve.

17. The method of claim 9, further comprising:

measuring a camshaft position at a temperature; and

comparing the camshaft position with a referenced camshaft position at the temperature, thus forming camshaft position data comprising a camshaft deviation for each temperature.

18. A camshaft position temperature compensation system comprising:

a curve fitting module configured to determine a plurality of camshaft deviation temperature curve coefficients;

a temperature sensor configured to measure a plurality of temperatures including a current temperature;

a camshaft position sensor configured to measure a plurality of camshaft positions including a current camshaft position; and

an updating module coupled to the temperature sensor, the camshaft position sensor, and the curve fitting module, configured to update a camshaft position based on the current temperature, the current camshaft position, and the camshaft deviation temperature curve coefficients.

19. The system of claim 18, further comprising a memory coupled to the curve fitting module, and configured to store camshaft position data.

20. The system of claim 18, wherein the curve fitting module approximates the deviation temperature curve coefficients with a numerical method.

21. The system of claim 20, wherein the numerical method is a linear interpolating polynomial.

22. The system of claim 18, wherein the temperature comprises at least one of an oil temperature, a coolant temperature, and a water temperature.

23. The system of claim 18 wherein the updating module plugs the current temperature into the camshaft deviation temperature curve coefficients to obtain a current camshaft deviation, and adds the current camshaft deviation to the current camshaft position thereby updating the camshaft position.

24. The system of claim 18, wherein the updating module determines a current camshaft deviation, multiplies the camshaft deviation gradient by the current temperature to obtain a deviation product, adds the deviation product to the current camshaft deviation to obtain a temperature compensated deviation, and adds the temperature compensated deviation to the current camshaft deviation thereby updating the camshaft position.

25. The system of claim 18, wherein the camshaft deviation temperature comprises a camshaft deviation gradient, and a camshaft deviation intercept.